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the canines as prehensile and lacerating organs, and that its insertion has advanced from behind forwards in the history of carnivorous types. Thus it is that the only accessible molars, the fourth above and the fifth below, have become specialized as sectorials, while the fifth, sixth, and seventh have, firstly, remained tubercular as in the dogs, or, secondly, have been lost, as in hyænas and cats.

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GRIEF IN THE CHIMPANZEE.

BY ARTHUR E. BROWN.

SOME months ago I called attention in the "Notes" of the NATURALIST to several evidences of a high degree of mental power on the part of the chimpanzee. One of the pair which, at that time, was in the Philadelphia Zoological Garden, has since died, and the behavior of the surviving one on that occasion appears to me to bear somewhat on the acquired nature of the physical means by which our strongly excited emotions find relief, as well as on the origin of those emotions themselves.

Among the lower animals, with the exception of some domesticated varieties, any striking display of grief at the death or separation from an animal to the companionship of which they had been accustomed, has rarely been observed, and although a few statements of such occurrences have been made by different authorities, it is probable that the feeling of individual association, or friendship—if the term may be so used—partakes too much of an abstract nature to be sufficiently developed in them to retain much of a place in memory when the immediate association be once past. This would seem to be the case even in one of the strongest of animal attachments—the maternal instinct—in which the direct presence of the offspring, acting as a stimulus, calls forth the emotion of the mother, which, strongly rooted as it appears to be, contains much of a reflex nature and ceases on the disappearance of its cause. And here let it be said, that although the instinct of maternity and the sentiment of friendship perhaps differ widely in their origin, yet in their manifestations they are so nearly alike that the reverse feelings excited by any violence done to them, need not and probably do not differ much in kind.

With the chimpanzee, the evidences of a certain degree of genuine grief were well marked. The two animals had lived together

for many months, and were much attached to each other; they were seldom apart and generally had their arms about each other's neck; they never quarreled, even over a pretended display of partiality by their keeper in feeding them, and if occasion required one to be handled with any degree of force, the other was always prepared to do battle in its behalf on the first cry of fright. After the death of the female, which took place early in the morning, the remaining one made many attempts to rouse her, and when he found this to be impossible his rage and grief were painful to witness. Tearing the hair, or rather snatching at the short hair on his head, was always one of his common expressions of extreme anger, and was now largely indulged in, but the ordinary yell of rage which he set up at first, finally changed to a cry which the keeper of the animals assures me he had never heard before, and which would be most nearly represented by *hah-ah-ah-ah-ah*, uttered somewhat under the breath, and with a plaintive sound like a moan. With this he made repeated efforts to arouse her, lifting up her head and hands, pushing her violently and rolling her over. After her body was removed from the cage—a proceeding which he violently opposed—he became more quiet, and remained so as long as his keeper was with him, but catching sight of the body once when the door was opened and again when it was carried past the front of the cage, he became violent, and cried for the rest of the day. The day following, he sat still most of the time and moaned continuously—this gradually passed away, however, and from that time he has only manifested a sense of a change in his surroundings by a more devoted attachment to his keeper, and a longer fit of anger when he leaves him. On these occasions it is curious to observe that the plaintive cry first heard when the female died, is frequently, though not always made use of, and when present, is heard towards the close of the fit of anger. It may well be that this sound having been specialized as a note of grief, and in this case never having previously been called into use by the occurrence of its proper emotion, now finds expression on the return of even the lesser degree of the same feeling given rise to by the absence of his keeper, and follows the first outbreak of rage in the same manner as the sobbing of a child is the natural sequence of a passionate fit of crying. It may be noted too, that as his attachment to his keeper is evidently stronger than when there was another to divide with him

the attention which they received, the grief now caused by the man's absence would naturally be much stronger and a more exact representation of the gestures of grief would be made.

Notwithstanding the intensity of his sorrow at first, it seems sufficiently evident that now a vivid recollection of the nature of the past association is not present. To test this a mirror was placed before him, with the expectation that on seeing a figure so exactly like his lost mate, some of the customary signs of recognition would take place, but even by caressing and pretending to feed the figure in the glass, not a trace of the expected feeling could be excited. In fact, the only visible indication of a change of circumstances is that while the two of them were accustomed to sleep at night in each other's arms on a blanket on the floor, which they moved from place to place to suit their convenience, since the death of the one, the other has invariably slept on a cross-beam at the top of the cage, returning to inherited habit and showing, probably, that the apprehension of unseen dangers has been heightened by his sense of loneliness.

On looking over the field of animal emotion it seems evident that any high degree of permanence in grief of this nature belongs only to man; slight indications of its persistence in memory are visible in some of the higher animals and domesticated races, but in most of them the feeling appears to be excited only by the failure of the inanimate body, while present to the sight, to perform the accustomed actions.

The foundation of the sentiment of grief is probably in a perception of loss sustained in being deprived of services which had been of use. An unrestrained indulgence in an emotion so powerful as this has become in its higher forms, would undoubtedly prevent due attention to the bodily necessities of the animal subjected to it; in man, its prostrating effects are mainly counteracted by an intelligent recognition of the desirability of repairing the injury suffered, and in him, therefore, the feeling may exist without serious detriment to his welfare, but among the lower animals it would seem probable that any tendency to its development would be checked by its own destructive effects—the feeling, for instance, would most frequently occur on the death of a mate—a deep and lasting grief would then tend to prevent a new association of like nature and would thus impede the performance of the first function of an animal in its relation to its kind—that of reproduction.